

TRANSLATION

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 03/07372 WO	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/EP2005/000494	International filing date (day/month/year) 19.01.2005	Priority date (day/month/year) 21.01.2004
International Patent Classification (IPC) or national classification and IPC G01M17/007		
Applicant TÜV AUTOMOTIVE GMBH		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 13 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☒ (sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:

☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input checked="" type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2005/000494

Box No. I

Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language _____ which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-8 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- nos. _____ as originally filed/furnished
- nos.* _____ as amended (together with any statement) under Article 19
- nos.* 1-7 received by this Authority on 13.12.2005 with letter of 13.12.2005
- nos.* _____ received by this Authority on _____
- ☒ the drawings:
- sheets 1/2, 2/2 as originally filed/furnished
- sheets* _____ received by this Authority on _____
- sheets* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____
4. ☒ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☒ the claims, nos. 3
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

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Box No. III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos. 2, 3

because:

☐ the said international application, or the said claims Nos. _____
relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 2
are so unclear that no meaningful opinion could be formed (*specify*):

See Supplemental Box.

☐ the claims, or said claims Nos. _____ are so inadequately supported
by the description that no meaningful opinion could be formed.

☐ no international search report has been established for said claims Nos. _____

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished☐ does not comply with the standard

the computer readable form

☐ has not been furnished☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☒ See Supplemental Box for further details.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims <u>1, 4-7</u>	YES
	Claims _____	NO
Inventive step (IS)	Claims _____	YES
	Claims <u>1, 4-7</u>	NO
Industrial applicability (IA)	Claims <u>1, 4-7</u>	YES
	Claims _____	NO

2. Citations and explanations (Rule 70.7)**1. PRIOR ART**

Reference is made to the following documents:

D1: PILUTTI TOM ET AL: "Vehicle steering intervention through differential braking", PROC AM CONTROL CONF; PROCEEDINGS OF THE AMERICAN CONTROL CONFERENCE 1995, Vol. 3, 1995, pages 1667-1671, XP002325942, SEATTLE, WA, USA.

D2: EP-A-0 445 671 (TECHNISCHER UEBERWACHUNGS-VEREIN BAYERN E.V.; TECHNISCHER UEBERWACHUNGS), 11 September 1991 (1991-09-11)

2. NOVELTY (PCT ARTICLE 33(1) AND 33(2))

2.1 Document D2 discloses (see, for example, the passages and drawings cited in the international search report) a system for carrying out crash tests and hence vehicle safety tests, containing a guide device (guide cable transmitter 2) for specifying a set path, and a speed control device (on-board controller 5 in conjunction with speed controller 13 and speed sensor 14) which interacts with the test vehicle to control its speed so that the vehicle follows the set path along the guide

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Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

cable 3 at a set speed (see, for example, column 2, lines 27 to 32).

The vehicle has its own engine, which also moves it during the test. The vehicle speed and direction are controlled by final control elements, which are used to change the engine speed and gear ratio and for steering and deceleration using the vehicle brakes.

2.2 The subject matter of claim 1 differs from that of D2 by virtue of the features specified in the characterising part of the claim.

2.3 Document D1 discloses (see, for example, the passages and drawings cited in the international search report) a method for driver-independent and hence "driverless" (in the broadest sense of the term) guidance of multitrack motor vehicles or cars along a set path, and a corresponding motor vehicle. The vehicle is steered using a system for keeping within specified road limits so that it follows a path defined by the said limits, and the vehicle has a braking device that can steer the vehicle by selectively braking at least one of its wheels in a controlled manner. A guide system determines the deviation from the specified path within the road limits and also determines the actual path, and a control system controls the necessary braking actions.

It is obvious that the vehicle described in D1, like any other vehicle, can be subjected to a crash test. The crucial point about crash tests is that the vehicles which are crashed must be serial production vehicles, otherwise the results would be meaningless and of no use

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to regulatory bodies, industry or end users.

2.4 The subject matter of claim 1 differs from that of D1 essentially in that it relates to a system for carrying out crash tests, with a guide system, a speed-influencing system and a control system for controlling a vehicle so that it can move along the set path and reach a set speed at the crash point.

2.5 The subject matter of claim 1 and of dependent claims 4 to 7 is therefore novel.

3. INVENTIVE STEP (PCT ARTICLE 33(1) AND 33(3))

3.1 The application fails to meet the requirements of PCT Article 33(1) because the subject matter of claim 1 and claims 4 to 7 does not involve an inventive step (PCT Article 33(3)).

3.2 The aforementioned document D2 is considered to be the prior art closest to the subject matter of independent claim 1.

3.3 The problem addressed can be seen as that of designing a simpler steering device.

3.4 The solution proposed in claim 1 of the application cannot be considered inventive (PCT Article 33(3)) for the following reasons:

- (i) A person skilled in the art would realise immediately that the vehicle known from D1 was suitable for use in the crash tests described in D2.

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Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Faced with the aforementioned problem, he would therefore have no hesitation in using the vehicle of D1 with the crash test device of D2, and would thereby arrive at what is claimed in claim 1.

- (ii) The skilled person would immediately see the advantage offered by the vehicle of D1 with its brake-action steering system for keeping the vehicle on a predefined path along the barrier. He would therefore even prefer to use a vehicle with a brake-action steering system for the crash test, because it would obviate the need for other more complex systems for keeping the vehicle on course.
- (iii) It is generally known in the art that braking is the same as deceleration or negative acceleration. On reading D1 the skilled person would immediately realise that the method and device described therein would work with the negative acceleration explicitly mentioned, and that the same result could naturally also be achieved with positive acceleration.
- (iv) The design of the claimed device therefore does not go beyond what a person skilled in the art would normally do on the basis of routine considerations, especially since the resulting advantages are readily predictable.

3.5 The features of dependent claims 4 to 7 relate to technical embodiments of the device according to claim 1 which do not go beyond what a person skilled in the art would normally do on the basis of routine considerations, especially since the resulting advantages are readily predictable.

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Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**4. INDUSTRIAL APPLICABILITY (PCT ARTICLE 33(1) AND 33(4))**

The invention as defined in the claims is undoubtedly industrially applicable, for example in crash tests for testing the safety standards of commercially available cars.

5. OTHER DEFECTS AND OBSERVATIONS

5.1 Some of the features of device claims 4 and 6 relate to a method for using the device rather than to the definition of the device in terms of its technical features. Consequently the intended limitations are not clear from the claims (PCT Article 6). This applies specifically to the following features:

- (i) "motors which **drive** wheels (...) and **are actuated** (...) so that the vehicle **changes direction in such a way that the deviation is reduced**" (claim 4)
- (ii) "the control system **controls** (...)" (claim 6)

5.2 Contrary to the requirements of PCT Rule 5.1(a)(ii), the description does not cite documents D1 and D2 or give an account of the relevant prior art disclosed therein.

5.3 The feature "at least approximately constant" in claim 3 is vague and unclear (PCT Article 6) because the term "approximately" does not define a range and is therefore meaningless in conjunction with terms such as "at least", which assume a lowermost value. In accordance with the standard practice of the Examining Authority it is permissible to use terms such as "about" or

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citations and explanations supporting such statement

"roughly", which cover a technically feasible tolerance range. Terms such as "about" and "roughly" obviously include the exact value.

5.4 **Suggestion:**

Claim 1 could be made novel and inventive by adding the following features:

"... the control system being fitted in the vehicle and having a memory in which is stored a characteristic map which records the correlation between brake actuation and the required additional opening of a load governor, such that when one or more of the wheel brakes is actuated for directional correction the engine load governor is opened further so that the additional driving torque compensates for the braking torque and the vehicle speed remains constant."

The adjustment of the motor driving torques on the basis of a characteristic map in order to keep the total driving torque of the vehicle constant when the steering wheel is turned is neither known from nor suggested by any of the prior art documents.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Boxes I and III

BOX I**Basis of the report**

1. Claim 3 has been ignored for the purposes of this report because it contains amendments which, in the opinion of the examiner, go beyond the disclosure in the international application as filed (PCT Article 34(2)(b) and PCT Rule 70.2(c)).
2. Claim 3 states that the control system is fitted in the vehicle and "**contains**" a memory, whereas the original application merely states that the control system "**has**" a memory (see, for example, the description, page 3, lines 7 to 8 and 27, and page 4, line 20). Thus the original application does not specify whether the memory is inside the control system or outside it.
3. Claim 3 also states that the memory contains "values which are dependent on the actuation of the wheel brakes and control an internal combustion engine in the vehicle". The original application states only the following:
 - (i) "Advantageously, when one or more of the wheel brakes is actuated for directional correction the engine load governor is opened further so that the additional driving torque compensates for the braking torque and the vehicle speed remains constant. The correlation between brake actuation and the required additional opening (for example,

Supplemental Box

of a throttle valve) can be stored in a characteristic map programmed into the memory of the control system 14." (page 4, lines 15 to 21)

- (ii) "Outputs of the control system 14 are connected to actuators 18 for the wheel brakes 8 (only one actuator is shown) and to an actuator 20 for actuating an engine load governor (engine not shown)." (page 3, lines 11 to 13)

Thus in the original application the control of the engine is limited to the opening of the load governor or throttle valve. Consequently the general "values" in claim 3, which do not establish a connection with the opening of the load governor or throttle valve, are inadmissible generalisations.

4. Claim 3 states that the values are stored so that "the sum of the engine torque driving the vehicle and the braking torque from the wheel brakes for directional correction is at least approximately constant". The original application states only the following:

- (i) "Advantageously, when one or more of the wheel brakes is actuated for directional correction the engine load governor is opened further so that the additional driving torque **compensates for** the braking torque and the vehicle speed remains constant." (page 4, lines 15 to 18).
- (ii) "The driving torques of the motors (30) are adjusted so that the total driving torque of the vehicle remains constant when the steering wheel is turned." (see the original claim 5)

Supplemental Box

Thus the original application merely states that the additional driving torque compensates for the braking torque and the vehicle speed remains constant, and that the total driving torque of the vehicle remains constant when the steering wheel is turned. There is no mention of a **sum**, which would in any case be problematic because of the vectorial properties and the signs of the torques.

5. Owing to the large number of amendments to claim 3 that go beyond the disclosure of the original claim, claim 3 has been ignored for the purposes of this report.

6. The amendments submitted with the letter of 13 December 2005 introduce material which, contrary to the requirement of PCT Article 34(2)(b), goes beyond the disclosure in the international application as filed. The amendment in question is as follows:

"at at least one point" (claim 1, line 5)

This feature of claim 1 has been ignored for the purposes of this report.

BOX III**Non-establishment of opinion with regard to novelty,
inventive step and industrial applicability**

1. Some of the features of device claim 2 relate to a method for using the device rather than to the definition of the device in terms of its technical features. More particularly, this applies to the fact that the device is operated in such a way that the vehicle speed "does not change". Consequently the

Supplemental Box

intended limitations are not clear from the claim
(PCT Article 6).

2. Claim 2 also fails to meet the requirements of PCT Article 6 because the subject matter for which protection is sought is not clearly defined. The claim seeks to define its subject matter by reference to the result which is to be achieved, and fails to state what is needed to enable the drive device and the braking device to interact to ensure that the vehicle speed does not change following a braking action for the purpose of bringing the actual path more closely into line with the set path. Claim 2 thus merely states the problem addressed without specifying the technical features needed in order to achieve that result, and consequently cannot be examined in this report. Claim 4 has been interpreted as being directly dependent on claim 1.